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14. ABSTRACT

Emphasis within planning needs to shift away from reductionism and towards a holistic understanding of the operational environment. This paper addresses the challenges with contemporary doctrinal operational planning and advocates a methodology that focuses on understanding the operational environment as the basis for future planning. Failure to change current doctrinal operational planning constructs will ensure that we win not win.

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NATIONAL DEFENSE UNIVERSITY

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JOINT ADVANCED WARFIGHTING SCHOOL

ENVIRONMENTAL DESIGN

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Environmental Design

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A paper submitted to the Faculty of the Joint Advanced Warfighting School in partial satisfaction of the requirements of a Master of Science Degree in Joint Campaign Planning and Strategy. The contents of this paper reflect my own personal views and are not necessarily endorsed by the Joint Forces Staff College or the Department of Defense.

This paper is entirely my own work except as documented in footnotes. (or appropriate statement per the Academic Integrity Policy)

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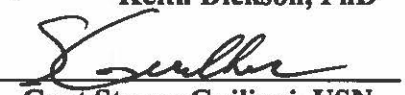
Approved by: Signature: 

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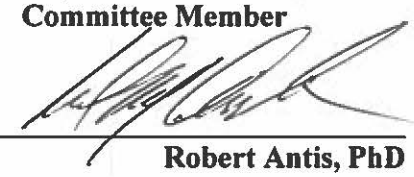
Signature: 

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ABSTRACT

Contemporary doctrinal operational planning has limited utility in the multi-layered strategic environment that defines the post-Cold War world. Increasingly, commanders and staff are planning for natural and man-made disasters that contribute to large-scale human suffering. Given the ambiguous and ever shifting nature of these disorientating and disordered events, commanders and staffs experience great pressure to master the situations they face. Operational Art and Operational design fails to address effectively these challenges. Doctrine remains focused at combating a conventional threat with a definable enemy. Processes that require understanding of a conventional enemy force become less useful when confronted with a mission spectrum from intra-state conflicts and terror networks, to humanitarian assistance and disaster relief. This failure stems from doctrine based on reductionist theories to develop operational plans. Reliance on a planning methodology that fails to appreciate the whole only repeats the operational failures of the past. Emphasis within planning needs to shift away from reductionism, towards a holistic understanding of the operational environment. This paper addresses the challenges with contemporary doctrinal operational planning and advocates a methodology that focuses on understanding the operational environment as the basis for future planning. Failure to change current doctrinal operational planning constructs will ensure that we win not win.

ACKNOWLEDGEMENTS

Born from a desire to assist senior defense leadership in the provision of best military advice to the political leadership, the concept of this paper intended to analyze decisions on the employment of the military, understand the successes and failures and seek the correlations. During the initial scope and research phase, deficiencies in contemporary western military doctrine to provide the basis for best military advice became apparent. My thanks, therefore, need to go to my advisor, Dr. Keith Dickson, who subtly but surely kept focus on this project and provided unwavering patience in what at times seemed like an unending rabbit warren.

I would also like to thank my family who demonstrated exceptional perseverance, understanding, and support. Without them, and their unconditional love, I would not have been able to dedicate myself towards this project.

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CHAPTER 1: INTRODUCTION

The strategic conditions that define the post-Cold War world are shaped by a vast variety of often confusing and multi-layered conflicts and wars often related to failing or failed states. Natural and man-made disasters also contribute to large-scale human suffering. Increasingly, the military forces of the West are employed to address these challenges. The ambiguous and ever shifting nature of these disorientating and disordered events demands that operational commanders and staffs are fully capable of mastering the situations they face.

Unfortunately, contemporary Western operational doctrine and planning fails to support the commander and staff in their efforts to employ operational art (Op Art) and operational design (Op Design) effectively to address these challenges. Doctrine is largely based on planning for a conventional threat – the classic force-on-force pattern that characterized most wars of the twentieth century.

In this new environment, however, doctrinal planning concepts that rely on understanding a conventional enemy force are less than useful when confronted with a mission spectrum that extends from intra-state conflicts and terror networks, to humanitarian assistance and disaster relief. This failure stems largely from intelligence estimates, which over time have moved to a red only focus. Planners tend to fixate on the products provided, focusing all effort at defeating the enemy center of gravity (COG), as defined by doctrine or by the intelligence estimate. This approach leads to significantly limited operational plans that are usually successful in what they set out to achieve, which is influencing a COG. However, the conditions that caused the crisis in the first place are unaffected and in most cases, influencing the COG alone does not change

conditions. Influencing the COG creates the illusion of success. Simply put, the plan failed to achieve real success related to the nature of the problem and the new conditions that arise as a result of the employment of military force. Unfortunately in most planning, appreciation of the complexity of the problem occurs only after the dynamic interactions have started. Emphasis within planning needs to shift away from reductionism, towards a holistic understanding of the operational environment.

Addressing this deficiency requires a relook of the doctrinal principles within Joint Intelligence Preparation of the Operating Environment (JIPOE). Emphasis needs to shift from identifying the COG, towards a holistic systems understanding central to identifying the problem and the conditions that shape the problem. Intelligence products and analysis need to provide planners with greater fidelity into the complexity of the operating environment directed toward understanding the systems at play. Understanding the systems and their interconnecting linkages, better informs the planner to appreciate the complexity of the problem and the dynamic interactions that shape problem definition.

Since the end of the Cold War, Western military forces have taken pride in winning battles, but have been continually frustrated in bringing about a satisfactory strategic outcome. In Somalia, Bosnia, Sarajevo, military efforts to quell unrest and aid a beleaguered population were mostly unsatisfactory. More recently, the U.S. led effort of regime change in Iraq and nation building in Afghanistan illustrate a lack of strategic clarity. Military efforts in Iraq are continuing due to Islamic State destabilization and Syrian state failure. The end state in Afghanistan appears to be continually shifting in order to adhere to a changing domestic political environment instead of the strategic

outcome. These examples provide insight into the failure of plans for military operations to achieve strategic success, not just successful military engagements. The operational planning process must continue to evolve relative to the changing environments that have emerged since the end of the Cold War.

To find an explanation for this condition, it is necessary to examine the framework for military planning, namely doctrinal Op Art and Op Design. At the heart of this examination is a blind adherence to Clausewitzian terminology. Essentially, contemporary military planning forms from a reductionist approach with the sole purpose of undermining the threat COG (if such a COG exists at all.) The reductionist COG analysis process – and its associated precepts of critical capabilities, requirements, and vulnerabilities - remains an important aspect of military doctrine, when applied in the right conditions and when required to analyze a conventional threat. Nevertheless, the reductionist approach arguably cannot establish the parameters for strategic success.

This approach fails to contribute to an understanding of the inherent changes in the systems that encompass the problem. Intelligence estimates that focus exclusively on red analysis, a threat based concept, hinder operational success by not providing a holistic understanding of the operating environment. Utilizing an environmental analysis framework for planning will assist in achieving both operational and strategic success. Planning needs to be as holistic as possible based on a comprehension of systems and effects that provide inputs derived from the operating environment, rather than exclusively threat focused.

A reinvigoration of JIPOE to enhance awareness of the operating environment will decrease the risk of operational misfocus. It will also improve the integration of the

intelligence and planning processes essential for planning in an ambiguous and multi-layered environment. Such integration involves recognition that operations are not a sole military responsibility, or even the decisive element for overall success.

This requires a cultural shift moving from single service or even military identities, to an inclusive holistic picture, formed by contributors from every facet of the national strategic community. Specifically, for cultural changes in Op Design, and the supporting JIPOE, the J2-J3-J5 needs to accept that a focus on the threat through reductive analysis is stifling opportunity for operational success. Central to acceptance of this thought is to highlight how the current system is not working and present a solution. With this understanding, true Op Art and Op Design is possible; without it, military actions continue to risk ending in strategic failures. An understanding, underpinned by observing the operating environment enables a phased approach to the defined problem. As actions occur, assessment of the reaction enables effective decision-making, leading to adaptive effort shifts that result in either a main or supporting effort change, or resource realignment, that maintains unity of effort to accomplish the strategic end state.

CHAPTER 2: DOCTRINAL OPERATIONAL DESIGN

A former combatant commander in 2014 told a group of officers that doctrine was the "last refuge of the unimaginative." Indeed, there is truth in this observation. All too often doctrinal formulas substitute informed disciplined thinking. Doctrine can be the crutch staffs use to avoid the time and effort necessary to develop plans that address the realities of a complex environment and refine the ambiguous conditions that characterize current military operations. Doctrine is an essential mechanistic science, but to be truly useful, needs imaginative art.

J.F.C. Fuller, the eminent British strategist, observed that doctrine emerges from a process that mimics the scientific method:

> We first observe, next we build up a hypothesis on the facts of our observation; then we deduce the consequences of our hypothesis and test these consequences by an analysis of phenomena; lastly we verify our results and if no exception can be found to them we call them a law.[1]

In military doctrine, there is a perception that such laws are unchallengeable; creating an intellectual impasse that curtails the imaginative aspects of the operational art. Doctrinal models provide a deductive mechanism to focus the planner to produce standardized assessments quickly. Reducing complex systems to pre-defined elements and sub-elements intends to enable simplification for rapid comprehension of the problem set. Once the model is completed, deduction ends, as reductionism assumes that the sum of the parts equals the whole.[2] Doctrine, by nature of its formulation, has reduced utility. It reflects agreed upon processes and ideas aimed at simplifying processes and

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[1] John F. C. Fuller, *The Foundations of the Science of War* (London: Hutchinson, 1926), 46.
[2] Ibid.

procedures for maximum efficiency. While this certainly has merits, something often indefinable is lost. The current doctrinal precept of Op Design is a case in point.

Op Design's intent is to provide an iterative approach to identifying the problem, framed by strategic guidance and an understanding of the environment. According to U.S. doctrine, Op Design is the "concentration and construction of the framework that underpins a campaign or major operation plan and its subsequent execution."[3] A JFSC student text based on doctrine elaborates, stating that the process encourages an iterative understanding and problem framing that supports Op Art with a model, or methodology, to design viable operational and campaign approaches. The methodology helps to provide a conceptual understanding of the broad solutions for attaining mission success and to reduce the complex operational environment uncertainty.[4] Op Design is intended to be the basis for joint planning, while doctrine is very simplistic about the outcome, it is silent on how these outcomes are promulgated. While purporting to be a non-linear and creative process, Op Design follows the same path as the majority of doctrine; encouraging planning teams to invest less rigorous intellectual effort in favor of a model based reductionist approach focused on the COG.

In doctrine, Op Art is supposed to encapsulate the commander's experience and initiative, but doctrine contains little or nothing on how to achieve it. Doctrine envisions the commander with powers of intellect and insight, above others, to shape the Op Design process. In reality, the commander lacks this greater insight and relies on his staff to provide it. Therefore, staffs utilize Op Design to develop an operational approach by

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[3] U.S. Joint Chiefs of Staff, *Joint Operation Planning*, Joint Publication 5-0 (Washington DC: Joint Chiefs of Staff, August 11 2011), GI-13.
[4] Drew Cukor, *Operate to Know: An Operations and Intelligence Design for the Operational Level*, (JFSC Student Text, 2014), 3-34 to 3-35.

conducting three key tasks: understand the strategic direction, understand the operational environment, and define the problem.[5] However, these key tasks fail to provide the basis for a process for problem formulation or for creative problem solving. How is this understanding and defining to be done? Outside of a few diagrams, scattered through ten pages of doctrine, there is no clear process.[6]

The strategic direction is the main concept that assists in defining a successful solution. Understanding guidance, through existing strategic documents, provides the commander with a concept of desired conditions. These are attained by analyzing the military end states, the objectives (or goals) that support the end states, and the effects (or conditions) underpinning the objectives.[7] Understanding the direction provided to other interested organizations is key. Mutual understanding assists the military planner to better integrate and nest the military objectives with other organization's requirements. In order for this process to be improved, greater emphasis placed on the interaction and integration of other organizations as early in the planning as possible is required.

Interorganizational planning and coordination is defined by Joint Publication 5-0 as the "interaction that occurs among elements of DOD; engaged USG departments and agencies; state, territorial, local, and tribal agencies; foreign military forces and government departments and agencies; IGOs; NGOs; and the private sector for the purpose of accomplishing an objective."[8] By its nature, interorganizational planning creates unity of effort among multiple organizations by "promoting common

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[5] Joint Publication 5-0, III-7.
[6] The methodology for Op Design is written over ten pages in Joint Publication 5-0, III-7 to III-17.
[7] Doctrine does not define desired conditions; however, the diagram in Joint Publication 5-0, III-15, highlights the importance of desired conditions to Op Design and the articulation of the operational approach.
[8] Joint Publication 5-0, II-35.

understanding of the capabilities, limitations, and consequences of military and civilian actions. It also assists with identifying common objectives and the ways in which military and civilian capabilities best complement each other to achieve these objectives."[9]

One of the unacknowledged truths in planning is that the military is the apparatus that creates the conditions for the often more important sectors to be able to execute their roles. Early interorganizational planning will change the aperture through which the military views its role informing a better understanding of the strategic direction. Understanding the strategic direction enables apportionment of objectives within the operating environment. It is vital to ensure planning commences with the other interested parties as early as possible.

Understanding the operating environment requires input from the strategic guidance, the nature of conflict, relevant history, and all of the physical and non-physical elements that interact. The commander must be able to describe the current state of the operating environment and how the environment should look once operations conclude. This understanding enables visualization of the approach to solve the problem.[10] To assist the commander's understanding of the current and future operational environment, a political, military, economic, social, information, and infrastructure (PMESII) analysis is used.[11]

PMESII is a systems analysis completed through the Joint Intelligence Preparation of the Operating Environment (JIPOE). It establishes a framework designed to determine relevant and critical relationships between the various actors and aspects of

[9] Ibid., II-35.
[10] Ibid., III-8.
[11] Ibid., III-9.

the operational environment.[12] The J-2 manages JIPOE to assist the commander, and staff, to understand the complex and interconnected operational environment. The composite of the conditions, circumstances, and influences that affect the employment of capabilities that bear on employment of the force decisions is critical to the commander. JIPOE has evolved into a threat focused, limited external consultation process that fails to provide the operating environment understanding for the commander. A subsequent chapter addresses JIPOE.

The third step of Op Design is to define the problem. Doctrinally, this step intends to identify the root cause of the issue at hand.[13] Understanding the analysis conducted so far, contextualized by the current environment and the desired environment, the analyst and planner identify the tensions and friction that would resist the transformation. Having identified the resistant factors, the planner must articulate the threat elements within the operational environment that must change to achieve the desired end state.[14] The result of this analysis is production of the problem statement.

The three key task methodology of Op Design presents as a logical process that helps focus military planners on the issue at hand through the production of a problem statement.[15] Nevertheless, Op Design, as outlined in doctrine, is too limited and too simplistic to support the commander or develop any kind of clear understanding to provide direction. An analysis of the doctrinal approach reveals a distinct lack of integration of other organizations goals or their analysis of the problem space, and the

[12] Ibid.
[13] Ibid., III-12.
[14] Ibid., III-13.
[15] Ibid., III-12.

limited opportunity to appreciate the interactions of smaller actors within the problem space.

It is an attempt to reduce the complexity of a dynamic environment to a focal point for ease of understanding. The impact of such an approach is a natural divergence from the systems interaction understanding, running the risk of addressing an issue, without appreciation of the impact of doing so. Reducing dynamic, complex issues to a singular focal point for planning may enable a simplistic understanding, but it does not foster military actions to supporting the bigger picture.

Understanding the limitations of this approach is critical to accepting alternate processes. Distilling the complexity of the environment to an issue, that theoretically enables favorable change; the problem statement ignores environmental systems analysis, disregarding the appreciation of dynamics and complexity within the environment.

The combatant commander referred to in the beginning of this chapter observed that the struggle and "the balance between the two [design and planning] varies from operation to operation as well as within each operation. Operational design must help the commander provide enough structure to an ill-structured problem so that planning can lead to effective action toward strategic objectives. Executed correctly, the two processes always are complementary, overlapping, synergistic, and continuous."

As JP 5-0 puts it, the integration of design and planning keeps the commander's "aperture as wide as possible to always question the mission's continuing relevance and suitability."[16] This will only occur if a holistic environmental understanding forms the foundation for the structure and methodology of Op Design. It must not come at the cost

[16] Ibid., IV-2.

of reductionism, which leads to conceptual stovepipes, a misapprehension of the problem and a lack of appreciation for the conditions that define operational – strategic success.

CHAPTER 3: REDUCTIONISM AND CENTER OF GRAVITY

Michael Evans posed a question in an article about the COG that is a direct challenge to the current doctrinal planning construct: "*can a nineteenth century approach to warfare be applied beyond large-scale conventional military operations to embrace twenty-first century irregular conflicts with all their attendant civil-military complexities?*"[1] In order to achieve decisive results in major combat operations, commanders, supported by their staffs, are required to assimilate vast quantities of information in order to prioritize actions in a way that achieves the most disproportional effect on the enemy at the least possible cost. This requirement has been true since the Napoleonic period, but how does this process apply to operations that do not entail large-scale combat?

For planners, the concept of center of gravity (COG) has become the most prominent example of Evan's question, with the concept central to planning doctrine. Can the Clausewitzian concept of COG still be useful outside of its conventional operational construct?

Clausewitz's seminal work, *On War*, continues to shape and direct Western military thinking and has had a deep influence on doctrine, especially the concept of a COG. While there is still conjecture about the exact meaning of the term, the utility of COG analysis to provide a focus for military effort remains prominent, even authoritative, in doctrinal publications.[2] The concept of a COG is useful in that it can

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[1] Michael Evans, "Centre of Gravity Analysis in Joint Military Planning and Design: Implications and Recommendations for the Australian Defence Force," *Security Challenges 8*, no. 2 (Winter 2012): 82, http://www.securitychallenges.org.au/ArticlePages/vol8no2Evans.html (accessed October 25, 2014).
[2] Rudolph M. Janiczek, "A Concept at the Crossroads: Rethinking the Center of Gravity," *Carlisle Papers in Security Strategy*, (Carlisle, PA: USAWC, October 2007), 1.

assist the planner in analyzing a conventional enemy force to its supporting elements by utilizing a reductionist approach. Analyzing these elements, the planner gains an understanding of the enemy's weaknesses, so that a focused attack will have the greatest effect and result in a rapid defeat.

U.S. joint doctrine defines center of gravity as "the source of power that provides moral or physical strength, freedom of action, or will to act."[3] Additionally, borrowing from Michael Howard's translation of Clausewitz to define the center of gravity:

> One must keep the dominant characteristics of both belligerents in mind. Out of these characteristics a certain center of gravity develops, the hub of all power and movement, upon which everything depends. That is the point against which all our energies should be directed . . . .[4]

Despite its acceptance into doctrine, the utility and meaning of the concept remains contentious. John Saxton describes this problem in terms of interpretation; "center of gravity means something to everyone, but not the same thing to anyone."[5] The COG concept became a central theme within operational planning during the Cold War. In the aftermath of Vietnam the U.S. Army, in particular, turned to the defense of Europe. Soviet Forces Germany, and its Warsaw Pact allies, represented the ultimate example of a Clausewitzian clash of wills that served his definition of war. "War," as Clausewitz instructed, "is an act of force to compel the enemy to do our will."[6]

Six years after the release of Michael Howard's translation of *On War,* Harry Summers's book, *On Strategy*, a study of the American failure in the Vietnam War, was

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[3] U.S. Joint Chiefs of Staff, *Joint Operations*, Joint Publication 3-0 (Washington DC: Joint Chiefs of Staff, August 11 2011), G-6.
[4] Carl von Clausewitz, *On War*, ed. and trans. Michael Howard and Peter Paret (Princeton: Princeton University Press, 1976), 595-6.
[5] John Saxman, *The Concept of Center of Gravity: Does it Have Utility in Joint Doctrine and Campaign Planning?* (Fort Leavenworth, KS: School of Advanced Military Studies, US Command and General Staff College, 1992), 4.
[6] Clausewitz, *On* War, 75.

published. Summers analyzes American strategy to *On War*, and argues that America misapplied the COG concept by misunderstanding the enemy forces, viewing the Viet Cong as a separate enemy as opposed to an instrument of North Vietnam. According to Summer's, inaccurate COG selection influenced operational planning that attributed to a lack of strategic success for political leadership. His thoughts, coupled with a reinvigorated interest towards *On War*, led to the rebirth of Clausewitz and the COG concept in the U.S. military.[7]

Doctrine concentrated on defeating a well-defined conventional enemy, utilizing technology to defeat rapidly a numerically superior foe.[8] This required an understanding of the enemy's center of gravity. Thus, Clausewitz's concept became the focal point of analysis to achieve a decisive victory. Adoption of Clausewitzian-based doctrine enabled calculation of the enemy's strength and concentrated attacks against it, but Clausewitz's definition was insufficient for proper analysis. To increase the utility of the concept and provide a framework for analysis, Antulio Echevarria analyzed the language of Clausewitz to highlight how principles of physics shaped Clausewitz's concept of the COG.

Echevarria described the COG as exerting a "certain centripetal force that tends to hold an entire system or structure together; thus, a blow at the COG would throw an enemy off balance and even cause the entire system to collapse."[9] Within this premise,

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[7] Evans, "Centre of Gravity Analysis," 86.
[8] Ibid.
[9] Antulio, Echevarria, "Clausewitz's Center of Gravity: It's Not What We Thought," *Naval War College Review*, 56, no. 2 (Winter 2003): 115, https://www.usnwc.edu/getattachment/d863be95-597d-4220-8cb6-169c80ca1f6b/Clausewitz-s-Center-of-Gravity--It-s-Not-What-We-T (accessed October 25, 2014).

understanding an enemy force as a sum of its parts will result in success. The COG concept received its revolutionary revision with the writings of Joe Strange.

In 1996, Joe Strange of the U.S. Marine Corps University published his thoughts on a capabilities based COG methodology. In essence, he offered military planners an approach to operationalize Clausewitz's theory, describing the COG as a "physical or moral source of strength." This strength has certain critical capabilities (CC) that define the moral or physical components strength. In turn, critical requirements (CR) exist that enable these CC to function. The analyst studies the CC and CR to deduce critical vulnerabilities (CV), that if attacked collapse the COG.[10]

Contemporary joint doctrine adopted Strange's definition and methodology for COG analysis to determine from which elements the adversary derives freedom of action, physical strength (means), and the will to fight.[11] Analysis of friendly and adversary COGs is a key step in operational design. Intelligence analysts focus efforts to identify the adversary COGs. This is critical to assisting the planners, who knowing the enemy force's CVs can focus all efforts against them in true Clausewitzian fashion.

Doctrine emphasizes the importance of identifying the correct COG. "One of the most important tasks confronting the JFCs staff during planning is identifying and analyzing friendly and adversary COGs."[12] It continues:

> The COG construct is useful as an analytical tool to help JFCs and staffs analyze friendly and adversary sources of strength as well as weaknesses and vulnerabilities. This process cannot be taken lightly, since a faulty conclusion resulting from a poor or hasty analysis can have very serious

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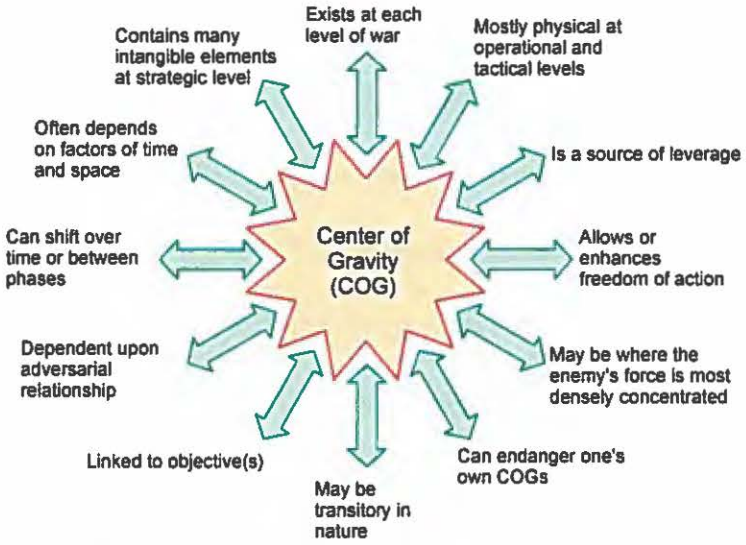
[10] Joseph Strange, "Centers of Gravity and Critical Vulnerabilities: Building on the Clausewitzian Foundation So We Can All Speak the Same Language," *Marine Corps University Perspectives on Warfighting*, 4, 2nd ed. (Quantico, VA: USMC Association, 1996), 3.
[11] Joint Publications 5-0, III-23.
[12] Ibid., III-22.

consequences, such as the inability to achieve strategic and operational objectives at an acceptable cost.[13]

The illustration below from JP 5-0 intends to enhance and clarify the doctrinal COG definition:

Figure 1: Characteristics of Centers of Gravity



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This diagram illustrates the problem with COG as Saxton noted. It means something different to everyone. Note how the concept has been confused with additional definitions. For example: How is a COG linked to objectives? The doctrinal definition makes no mention of objectives nor does doctrine refer to COG in its description of objectives. How can a COG be transitory or for that matter shift from one phase to another? Doctrinal definitions make the COG the hub, the focal point – it cannot shift or change if defined according to the reductionist Strange model.

[13] Ibid., III-23.
[14] Ibid.

Can a center of gravity exist at the tactical level? Is such a concept useful for planners at the combatant command or JTF level? Doctrine makes no distinction between strategic to tactical COG analysis processes. The illustration is filled with statements describing characteristics that only serve to confuse the role of the COG.

Enabling reductive modeling provides simplistic answers for complex problems, which explains their popularity and persistence. Dietrich Dörner argues that once a reductive analysis occurs, the analyst is reluctant to abandon that knowledge and move back to the complexity of an unknown system. The unknown system produces uncertainty; uncertainty produces fear.[15] Therefore, despite the relative popularity of these models, they remain incomplete, neglecting the side effects and repercussions, therefore guaranteeing a disappointing outcome.

Echevarria completes his thoughts on the COG by expounding that Clausewitz's theory of COG only holds utility when the theory is accurately comprehended. In essence, it is a construct used for the specific effect of the collapse of the enemy.[16] COG analysis provides a framework to identify strengths, weaknesses, and vulnerabilities on an enemy, enabling military planning to commence. To deal with the environment through the lens of COG (and other reductive models) saves cognitive energy, but one underpinning assumption to this reductionist model is false.[17] Systems do not directly equal the sum of their parts.[18] This assertion is based on influence. The influence of

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[15] Dietrich Dörner, *The Logic of Failure: Recognizing and Avoiding Error in Complex Situations*, ed. Rita and Robert Kimber (New York: Metropolitan Books, 1996), 91-92.
[16] Antulio Echevarria, *Clausewitz's Center of Gravity: Changing our Warfighting Doctrine-Again!* (Strategic Studies Institute, U.S. Army War College: Carlisle, PA, September 2002), 12.
[17] Dörner, *The Logic of Failure*, 88.
[18] Cukor, *Operate to* Know, 40.

variables within systems of the operating environment may be disproportionate to the whole.[19]

Further complicating the reductionist approach is intransparence. Simply, intransparence is characterized by acknowledging, "what we really want to see may not be visible."[20] Intransparence injects further uncertainty into planning, reinforcing the negative cycle of falling back onto reductive processes that do not require acknowledgement of these uncertainties.

Figure 1 is an unintended reflection of attempting to place a reductionism concept into a systems approach. While no system is mentioned, all of the dual pointing arrows imply action and reaction within a system. Thus, the COG concept becomes subsumed and is continuously defined and redefined by the system, not by the analyst.

Current processes do not adequately consider the complexity and dynamic nature of the operating environment, shying away from intransparence. As a concept and approach, the current planning construct for contemporary operations is in question.

[19] For the purpose of this paper variables represent tangible and intangible elements within a system, for example infrastructure, individuals, military capability, race, religion, and culture.
[20] Dörner, *Logic of Failure*, 40.

CHAPTER 4: HOW JIPOE SUPPORTS REDUCTIONISM

Operational commanders and staffs remain tied to a reductionist approach within Op Design. This reductionist approach addresses conventional military forces in a conventional military campaign, but for other operations, doctrine is silent. When faced with something other than a conventional military threat, commanders and staffs can only apply the conventional planning construct, attempting to reduce issues to a COG. The joint intelligence preparation of the environment (JIPOE) supports COG formulation and supports planners in Op Design. The continual return to COG reinforces planners to utilize a conventional construct that only has a vague semblance to the situations and conditions of a standard conventional campaign. Thus, staffs plan using a construct that has little or no relation to the problem. Military operations in the post-Cold War era need to be planned using a much more adaptable operational design that allows commanders and staff the ability to understand an environment, and create plans capable of achieving objectives to support larger strategic end states.

To conduct the reductionist approach outlined in doctrine, commanders and staff are heavily reliant on the JIPOE, a joint process that seeks to achieve input from a wide base of sources in order to provide the understanding of the operational environment and the adversary. The JIPOE is produced in the Joint Intelligence Operations Center (JIOC), which serves as the focal point for tasking the production of baseline strategic intelligence analysis in support of current and planned joint operations.[1] Joint Publication 2-01.3 defines JIPOE as a continuous "analytical process used by joint intelligence organizations to produce intelligence assessments, estimates, and other intelligence

[1] U.S. Joint Chiefs of Staff, *Joint Intelligence Preparation of the Operational Environment*, Joint Publication 2-01.3 (Washington DC: Joint Chiefs of Staff, June 16 2009), xiv.

products in support of the joint force commander's (JFC's) decision-making process."[2] The intent of the JIPOE process is to assist commanders and staff to identify adversary COGs and "analyze the impact of the operational environment on military operations"[3] achieving what doctrine describes as "information superiority."[4] Doctrine elaborates on this point:

> The JIPOE process assists JFCs and their staffs in achieving information superiority by identifying *adversary centers of gravity (COGs),* focusing intelligence collection at the right time and place, and analyzing the *impact of the operational environment on military operations.* However, JIPOE's main focus is on providing predictive intelligence designed to help the JFC discern the *adversary's probable intent and most likely future COA.* Simply stated, JIPOE helps the JFC to *stay inside the adversary's decision-making* cycle in order to react faster and make better decisions than the adversary.[5]

Understanding the doctrinal intent of JIPOE raises immediate questions. What is information superiority? Moreover, at the strategic and operational level, why should planners not analyze the impact of military operations on the environment, rather than a terrain-implied analysis as is currently stated? Without understanding the impact of military operations on an environment, a military action may actually destabilize the environment and worsen the situation. Similarly, information superiority refers to a situation where information dominance enables commanders to make decisions at a faster rate than the adversary can. The focus is clearly targeted at a military organization as an adversary. Contemporary planners require a holistic understanding of the environment to develop options that are not solely developed from a reductionist methodology. A holistic understanding refers to information and structures that define the environment's systems

[2] Ibid., xi.
[3] Ibid., I-1.
[4] Ibid.
[5] Ibid.

and subsystems with variables, interconnections, and a defined function or purpose.[6] It refers to the whole environment as complex and dynamic with a determination of where the whole is moving over time.[7]

Doctrine defines JIPOE as a continuous process that involves four major steps: defining the operational environment, describing the impact of the operational environment, evaluating the adversary, and determining and describing adversary potential courses of action (COAs).[8] The first step of JIPOE establishes a reductionist process that continues to reduce analysis as it progresses.

Defining the environment requires a simplification of the geographic area, a reduction of focus to an area of operations and an area of interest. Analyzing this simplified geographic area provides an assessment of influences against the focal point of military operations. This simple process supports reductionism by placing the defined environment in the context of military operations, shaping subsequent thought. Following the process, a definition of the adversary enables the inevitable search for a COG. Supporting this reductionist analysis, generation of a COA implies that the adversary is military, or at least has a quasi-military focus. Allowing staffs to fall back on to what they know. Individual critique of the steps offers further insight into doctrinal limitations.

The task of narrowing the geographic area is designed to provide a frame for subsequent analysis. Defining the operating environment without an understanding of the influences within the environment prevents a holistic understanding. Within the context of a globalized media and ill-defined actors, state borders and historical lines on maps

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[6] Donella Meadows, *Thinking in Systems – A Primer* (White River Junction: Vermont, Chelsea Green Publishing, 2008), 11.
[7] Dörner, *Logic of Failure*, 40.
[8] Joint Publication 2-01.3, II-2 to II-8.

become meaningless. Operations will require an area of responsibility that is not bounded in three dimensions. The collection of information needs to be based on influencing factors towards achieving the end states. Collection informed by end states enables a starting point to understand the interacting systems and better defines the holistic operational environment.

Doctrinally, with the operational environment defined, step two of JIPOE is describing the impact of the operational environment on military operations. This step is broken down into sub-tasks, namely; developing a geospatial perspective of the operational environment, and a systems perspective of the operational environment.[9] The geospatial perspective concentrates on the physical, non-physical, and locational aspects of the environment, examining relative characteristics, to evaluate their potential impact on military operations.[10] This, because the environment is defined in the context of friendly forces, becomes a terrain analysis intended to support movement and maneuver, otherwise it holds little utility in contributing to understanding. The systems perspective is intended to identify and analyze "all major elements within friendly, adversary, or neutral Political, Military, Economic, Social, Information, and Infrastructure systems and sub-systems that are potentially relevant to the success of a joint operation."[11]

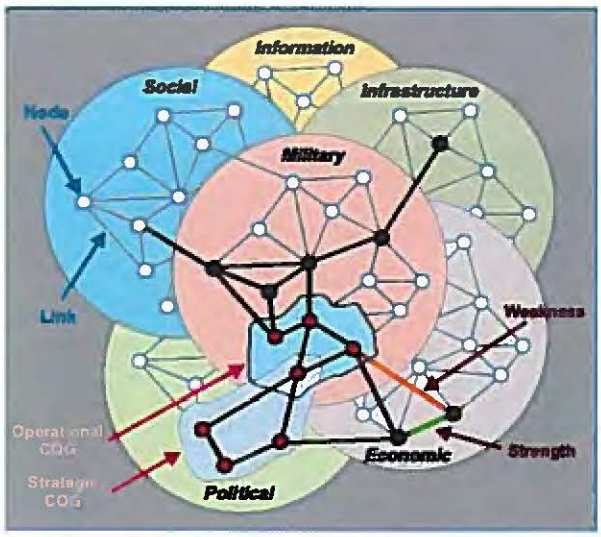
The JIPOE advocates a Political, Military, Economic, Social, Information, and Infrastructure (PMESII) analysis to represent the potential relevance of the systems to joint operations. As the title of step two states, the purpose is to understand how the environment will influence military operations, rather than understanding how military

[9] Ibid., II-9.
[10] Ibid., II-10.
[11] Ibid., II-45.

operations will impact the environment. The use of the PMSEII model does little more than attempt to reduce a system to targetable sub-systems, in the endeavor to identify a COG. The following diagrams taken from JP 2-01.3, apparently illustrate this step, but there are no explanations as to how to develop such a structure, how to analyze it, or how to identify nodes and links (or even what nodes and links are, or what purpose they serve). There is a lack of explanatory information for understanding how to utilize a systems approach.

The figure below depicts the supposed utility of PMSEII as a systems model to assist in the identification of the threat COG. The intent is to illustrate the linkages across the system model in order to identify the key nodes that have greatest interaction within the system, and therefore highlighting their importance. The deterministic reductionist approach asserts that once identified, the key nodes assist in the identification of the COG.

Figure 2: Systems perspective of the operational environment



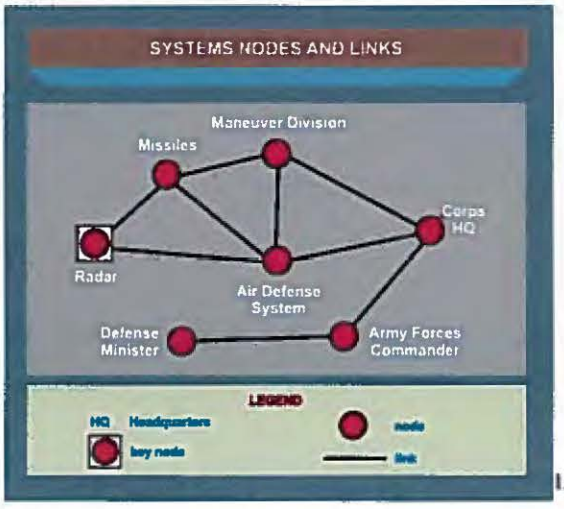
[12]

[12] Ibid., II-45.

Figure 2 shows strengths and weaknesses of two linkages, but fails to describe the frame, or perspective, for this assessment. Other links hold the same visual representation, but fail to qualify as either. How do you determine a link as a strength, opposed to a weakness, and why are they significant? Ultimately, the inclusion of undefined terms confuses this doctrinal figure, whose ultimate aim appears to be the identification of the strategic and operational COG.

Studying the key nodes theoretically enables reduction, shown in figure 3, of the problem to its most simple form, demonstrating linkages across the spectrum depth of strategic level through to tactical. In the doctrinal example, targeting the adversary radar at a tactical level will undermine the operational COG. Why not examine methods to disrupt the Corps HQ directly and therefore severe all of the links from a key node? Arguably, missiles are not the only requirement for a maneuver division to operate; similarly, radar is one component of the air defense spectrum. Removing the capability will be initially disruptive on one front; however, other capabilities will inform the air picture to mitigate the loss.

Figure 3: Systems nodes and links

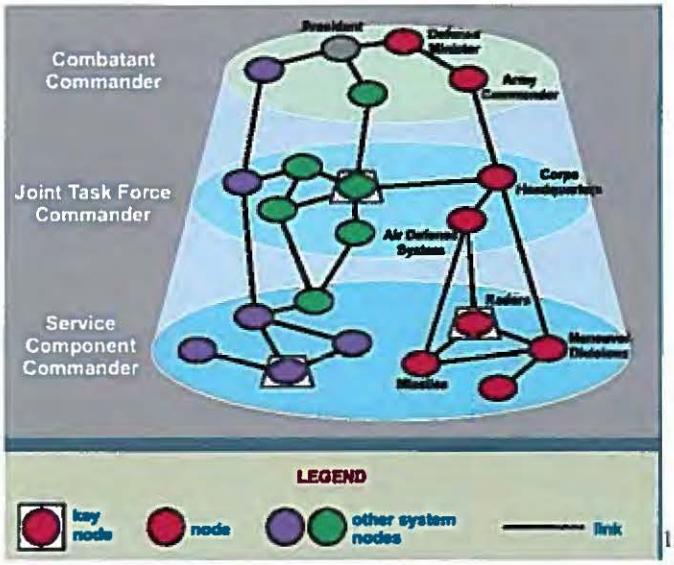


[13]

[13] Ibid., II-46.

What the examples fail to present is the key understanding of causation and effect, or provide the concept in a coherent manner. In the presented form, there is great risk of doctrine misleading the reader. How do the diagrams assist in understanding systems, or reveal the connections and weaknesses? The requirement to keep nodes tangible (people, places, or material things)[14] has the potential to push the analyst towards a reductionist targeting process.

Figure 4: Breadth and depth of systems perspective



[15]

These examples remain misleading and ultimately useless, highlighting the ingrained tendency of military planners and analysts to reduce problems to a targetable solution. Figure 3 identified the radar as a key node. The other key nodes in figure 4 are unidentified so there is no way to understand any logical linkage at the task force or component level. Yet in figure 4, the links through the Corps HQ suggest greater

[14] Ibid., II-46.
[15] Ibid., II-49.

importance and potential identification as a key node than the other key nodes shown. The effect on the military system would be greater. In essence, the doctrinal process lacks sophistication and contributes to reductionist, even simplistic thinking. Supposedly, by identifying the key node of a capability, a system can demonstrate how the neutralization of that key node will contribute to undermine the system's structure. The search for a key node that will create instant success captivates military planners and leads analysts to name anything (or everything) a key node – from something as obvious as a radar array for a missile system (which contributes little to understanding) to some arcane and ill-defined structure that is also not useful. The doctrinal systems perspective leads analysis to copy a template, identifying the obvious and missing the significant aspects of the systems within the environment. The result is a focus towards the necessity of a defining first, an adversary, and second, a COG.

Doctrine does not make clear how the JIPOE's systems approach is to lead to any definitive understanding – except for the determination of the COG. There is similar misleading information for the utility of the COG. "One of the most important tasks confronting the JIPOE analyst is the identification of adversary COGs . . . . A COG is always linked to the objective."[16] Not only is the first statement a requirement for a reductionist search for something that may or may not exist (that will be defined anyway), the second statement is incorrect based on the doctrinal definition of both a COG and an objective. A COG does not link to an objective; nor does doctrine explain why the assertion is true. The reduction of the JIPOE to determine a COG negates any value of the systems analysis, drives everything into a targeting posture, and ignores any

[16] Ibid., II-65.

considerations of the environment. The JIPOE, outside of examining a conventional force of an established state, can provide nothing more than stock answers that can be deduced without the pretense of a pseudo-process providing obvious conclusions.

The last analytical step of JIPOE is to produce adversary COAs. Whether this is linked to the systems analysis or a separate process is uncertain. Yet, the expectation of the process is the same: a predictive result that is incorporated into the planning process.[17]

Here, it is essential to appreciate that every action in the environment will influence systems within it. Resources need to be dedicated to observing environmental changes once operations begin. However, the analysis of the physical, non-physical, and locational aspects evaluated only against their potential impact on military operations hinders the full utility of the information presented. Many actors influence the operating environment, within the land, maritime, air, space, information, or cyber domains. Each actor will utilize different domains at constantly varying levels within the operating environment. When introducing military force into this environment, each actor will experience differing levels of influence or friction within the domains it functions within. Understanding these freedoms and frictions of domain access provides an understanding of the interconnectedness of actors to the domains and as a result, the environment. The connections and interactions of actors are key to developing an understanding of the complexities of the environment.

By removing the focus from the threat as a singular entity and providing a trend analysis approach to the environment, the analyst and planner is enabled to avoid

[17] Ibid., II-68 to II-81.

mistakes of the past. Environmental trend analysis provides greater utility to a planner facing an ambiguous threat than a COA and COG analysis. A direct linkage between the environment and the environment as a system is necessary. In defining this further, the environment is complex (made up of interacting systems) and dynamic (will continue to change regardless of external influences). Before interaction within the environment commences, it must be analyzed to understand and define what is normal for that environment. Despite the natural tendency to improve the environment, the consequences of actions need to be properly analyzed against the environment to assess the potential impact. JIPOE fails to utilize this approach. It neither understands the environment as complex or dynamic, nor does it account for transposing actions onto an environment to assess potential impact. Failure to take this approach may lead to activities that will potentially transform the environment in a detrimental and unpredicted manner. Understanding the direction that the environment is moving is key to predict the *impact of military operations on the environment*, and understanding the influences that would transform the environment in favor of strategic requirements.

CHAPTER 5: MODIFYING DESIGN FOR CONTEMPORARY CONDITIONS

The complexity of the contemporary world with its variety of military and non-military threats, its state, non-state, and sub-state actors, and the growing importance of the information domain all point to a modification of the way military planners address operational planning to meet strategic objectives. A more finely developed system of analysis is required to support operational design. This chapter will detail an approach to inspire further thought on environmental systems analysis as a basis for operational planning that reflects the realities of the post-Cold War world.

There are six steps for this approach, which is intended to produce an Environmental Design.

1. Clear understanding of strategic guidance and strategic ends. (Strategic focus).
2. Apply this understanding to develop an initial statement of conditions within an environment delineated by the strategic focus (Build the reality model).
3. Build an environmental picture by examining change and interaction over time through analytic frames. Confirm understanding of the variables and links with definable purpose. (Determine trends to develop further the resulting reality model).
4. Establish patterns and trends through various analytic frames. (Develop a trend of behavior based on analytic frames).
5. Develop hypotheses for how the employment of military force will influence the systems and assess both positive and negative reactions and their relationships and how these relationships influence the environment toward

achieving the political strategic end state. (Assessment of external influences on the trend model).

6. Develop an environmental design by defining objectives, effects, focal points, and lines of effort that lead to achieving the end states. Focal points are the focus for influencing the environment that produces effects within the systems, which achieve the objectives, which in turn support the political strategic ends. (Graphical representation of temporal systems interaction).

Step one. Key to developing an environmental analysis is to establish clear and definable goals and objectives. The Op Design methodology of understanding strategic direction is sound. The result is an understanding of the strategic end states that define success and support national interests and their relationship to objectives. Critical to maintaining the integrity of the process is to ensure that the strategic political intent remains visual constantly at the forefront and an understanding of other supporting organizational goals is accounted for. This is especially important for operations not involving a conventional force threat.

Inherent is recognition that military operations do not create success, but only the conditions for other elements of national power to achieve success. Success cannot occur without other organizations. The collaborative nature of planning is to define the objectives correctly. This is important because focal points relate to objectives, allowing the subsequent environmental design to achieve strategic ends. With the establishment of objectives, a focused understanding of the operating environment can commence.

Step two. Visualization of the current environment, and the assessment of how the environment can be affected to achieve the desired objectives, provides an initial focal

point to commence a systems observation process. Achieving a holistic understanding of the environment is a daunting task as it refers to information and structures that define the environment's systems and subsystems with variables, interconnections, and a defined function or purpose, and what direction the environment is moving over time. [1] This initial understanding of the environment, implicit or explicit, is what Dörner describes as the reality model.[2] Decisions have to be made about where to focus scarce collection resources. Thus, the most operationally significant systems that make up the environment must be identified.

The environment is both complex and dynamic because it is composed of systems, which continually interact. As Dörner points out:

> Complexity is the label we will give to the existence of many interdependent variables in a given system. The more variables and the greater their interdependence, the greater the system's complexity. Great complexity places high demands on a planner's capacities to gather information, integrate findings, and design effective actions.[3]

Concentration on identifying and understanding the variables within an operationally, or strategically, significant system that assists in achieving strategic objectives is key. Visualizing how the environment must be transformed to achieve these objectives is very important because identifying the proper systems, and revealing the variables within that system that require change, provide the entry point to understand the environmental dynamics. Observing these key variables over time, links between variables become apparent.[4] Links, or connections, are represented as either a positive,

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[1] See Meadows, *Thinking in Systems*, 11, and Dörner, *Logic of* Failure, 40.
[2] Dörner, *Logic of* Failure, 40-41.
[3] Ibid., 38.
[4] Links are defined as an identified connection between variables. These connections represent interaction of either a positive or negative influence.

negative, or a neutral influence toward achieving the objectives. Temporal comparison assists in defining the nature of influence. The figure below shows a pond as a system, highlighting the links between variables. Positive (+), neutral, and negative (-) influences are diagrammatically represented, while reinforcing loops are also depicted. Recognition that not all variables can be depicted, understood, or are relevant to the analyzed system may also be represented.

Figure 5: Dörner's Simplified System - Pond

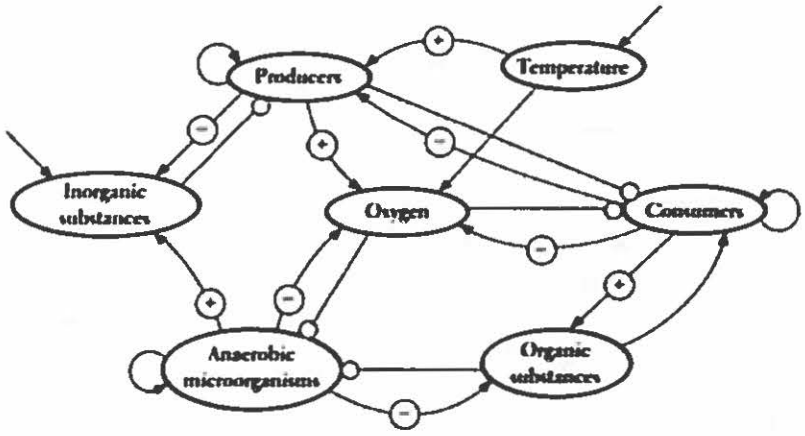


Fig. 12. A pond as a system [5]

Identifying links between the operationally significant systems assists in the identification of other variables or influencing factors. Interactions between systems may also become apparent. As this picture develops, an initial understanding of the environment is formed. Dörner stresses the importance of the relationship between link and variables:

> The links between the variables obliges us to attend to a great many features simultaneously, and that, concomitantly, makes it impossible for us to undertake only one action in a complex system.[6]

[5] Dörner, *Logic of Failure*, 73.
[6] Ibid., 38.

Acceptance that this reality model is incomplete is essential. This initial incomplete understanding of the systems and inherent variables will be further complemented by additional information collected about the environment, in turn enabling the reality model to be further refined to support operational design.

Step three. Revisiting and refining the model based on collection and observations is critical to identify operationally significant systems. The analysis of the trend model develops operationally significant systems within the environment. Incorporation of the changes over time enables a better understanding of the operational environment and validates that the selected key variables, and links associated with operationally significant systems remain valid. As information collected over time is incorporated into the reality model, changes in the environment may become evident. This information enables a more accurate understanding of the changes to the overall environment and the role the operationally significant systems play in changing the environment. This understanding will assist in framing how the systems will need to be influenced to achieve the desired outcomes. The staff can now develop a narrative to influence the environment through the selected systems.

Step four. Targeted collection of the selected systems provides an understanding of the changes occurring within the environment. The directional trend of the systems of interest becomes apparent. Utilizing the changes observed over time provides a trend model of the environment through a series of analytic frames of the reality model. Understanding the variables within the system, observing the links, and developing a trend of behavior through analytic frames, is key to understanding the environment as a whole.

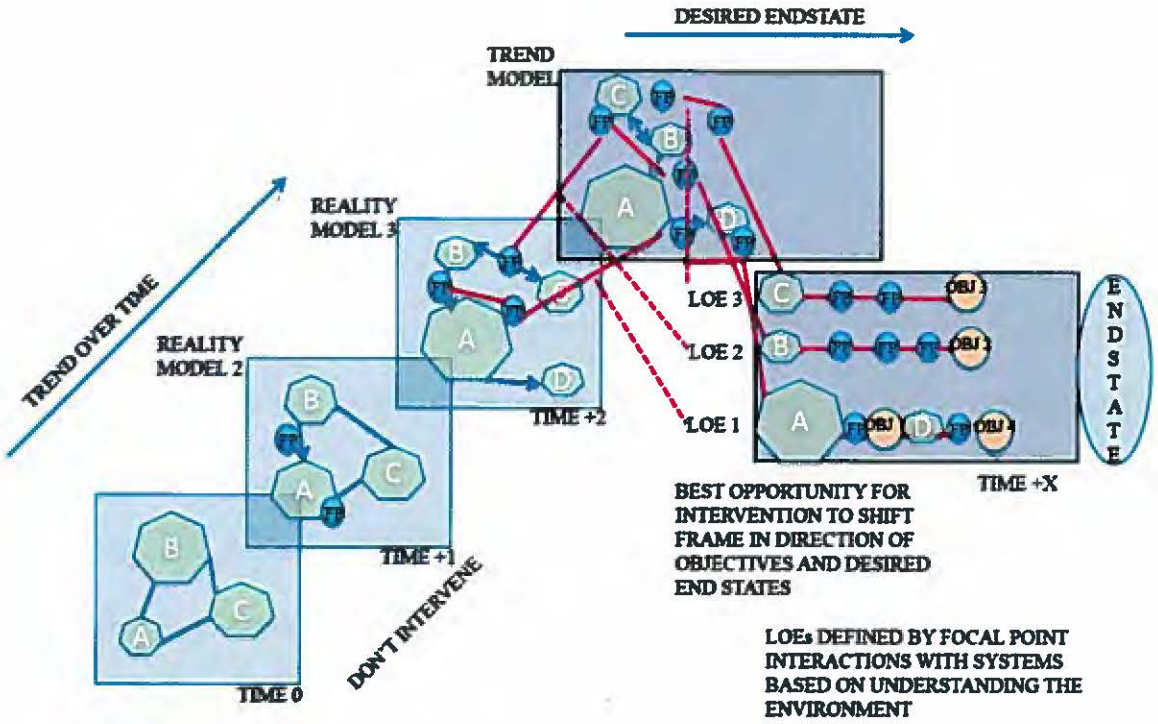
Step five. The analytic frames establish the trends that allow for an informed opinion in how, where and when an action can influence the operationally significant systems. Utilizing the trend model, relevant actor aims can be transposed into the system. These aims, and later actions, will be contrasted against the variables' tendencies (inclination to think or behave in a certain manner) and potentials (ability or capacity), in concert with the links to other variables.[7] This analysis provides a holistic predictive assessment of the imposition of an external actor onto complex and dynamic systems based on the forces capabilities. Utilization of this approach assists in ascertaining any likely anomalies or conflicts within the environment and subsequently provides a basis for defining tasks, focal points, lines of effort, as well as deriving assumptions, limitations and risk.

Step six. Consolidation of the focal points through the environmental trend analysis enables their allocation to systems as defined lines of effort. Depicting these operationally significant systems as the lines of effort enables development of a graphic, showing how the links and variables are associated to the line of effort, and what focal points have to be influenced or controlled in temporal relation to the trend model. Links between focal points are drawn, to show important relationships to the line of effort. Lastly, a phasing construct may be added to demonstrate desired change and order of change over time. This assists in the understanding of when the military may have predominance in the operation, and when the military will provide a supporting role. Representing the operational approach in this manner demonstrates the interrelated nature of the systems within an environment. It graphically demonstrates how an operation will

[7] Joint Publication 5-0, III-11.

move temporally through an environment, achieving the strategic political objectives, and supports Dörner's principle that an action on one part of the system will have side effects and repercussions on the other parts of the system.[8] A rudimentary figure is below:

Figure 6: Environmental Design Model



[8] Ibid., 38.

CHAPTER 6: CONCLUSION

This paper argues that the failure of recent military operations to achieve end states is directly attributable to a misdirected and incomplete military planning process. The current methodology and culture associated with planning is not preparing commanders to inform the political leadership on the implications and methods for employing the military to achieve unity of effort.

Planning doctrine inadequately represents an understanding of complexity because of its reliance on a reductionist approach. The post-Cold War strategic environment has presented a plethora of challenges, many of which involve irregular adversaries or arise from conditions due to natural or man-made disasters. A more intuitive process based on an environmental design will yield the necessary insights to develop an operational design to guide planning.

This paper argues for a cultural shift away from reductive analysis when it does not apply. It advocates for a more holistic understanding of the environment and systemic influences to develop a trend model that reveals the likely impact of operations, which will inform decisions on the application of military force that will lead to an effective strategic political end state.

The ability to observe the environment and achieve an understanding of operationally significant systems is key. This emphasis requires a cultural shift from current analysis and planning structures to a more inclusive understanding and focused collection. The achievement of unified effort occurs through the synergies of planning with external agencies. Internal changes that encourage dialogue and analysis will capture the benefit of this planning approach.

The reductionist approach cannot address intransparence. Intransparence is the injection of uncertainty into planning.[1] The planner or analyst cannot really see what he or she would like to be visible: population sentiment towards multinational forces; insurgent networks; or, tectonic plate movements that cause natural disasters. Decisions, nonetheless, are required. Rather than attempting to solve the unknown, which the current doctrinal approach attempts to do, acceptance of the unknown requires inherent flexibility and observation of the other systems, variables, and links that may assist in providing additional insight. This enables the team to continue to develop a reality model despite a lack of clarity. The reality model assists in defining complexity not as an "objective factor but a subjective one."[2] As greater knowledge develops about the operational environment, structural knowledge of how variables in the system are related and how they influence one another becomes apparent.

The environmental design accepts complexity and intransparence together, to enable observers and analysts to identify trends within operationally significant systems. Rather than being able to describe where a system is at any given moment, more useful is the ability to relay the overarching trend of system movement within the environment.[3]

Planning requires an appreciation of trends and interactions of operationally significant systems over time. Identifying variables and linkages that influence these systems builds a concept for influencing these systems so that the changes that occur support the achievement of objectives that meet the strategic political end states. This

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[1] Dörner, *Logic of Failure*, 40.
[2] Ibid., 39.
[3] Ibid., 39-40.

information becomes useful when analyzing how to associate focal points and lines of effort to inform an environmental design.

Environmental design's six steps offer a way for planners to address planning problems that do not involve conventional military forces as the threat. Environmental design allows planners to be comfortable with complexity without having to reduce problems to a basic, simplistic form. It creates the means to reshape a complex, dynamic environment in ways favorable to national interests.

APPENDIX 1: THE REDUCTIONIST APPROACH APPLIED: IRAQ 2003

Defense Secretary Donald Rumsfeld outlined two political strategic ends of Operation Iraqi Freedom (OIF) during an address to the nation on 21 March 2003: eliminate weapons of mass destruction (WMD) and liberate the Iraqi people.[4] These ends were supported by the following military goals (objectives): end Saddam Hussein's regime, isolate and eliminate Iraq's WMD (including missiles, delivery systems, production capabilities, and networks), capture or drive out terrorists seeking refuge in Iraq, end the sanctions and deliver humanitarian relief to Iraqi citizens, secure the oil fields and resources, and create the conditions for Iraq's rapid transition to a representative government.[5] The strategic political ends of eliminating WMD while liberating the Iraqi people created an extensive and broad set of objectives that presented the U.S. led coalition with enormously complex challenges

The selection of these objectives would indicate a direct link to a problem (definition) that would be addressed by military action. Examining these objectives, it becomes apparent that using the doctrinal JIPOE examples, initial military tasks required Saddam, WMD, and oil fields to be the linked nodes. Thus, a reductionist approach that required identifying a COG made the selection of Saddam Hussein rather simple.

Further reducing the COG to its capabilities quickly identified those aspects that provided Saddam his strength; namely the military and its leadership, and the security organizations that fed his power by controlling the civilian population. Removing Saddam would therefore neutralize the nodes and links that were connected to him. This

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[4] Jim Garamene, "Rumsfeld Lists Operation Iraqi Freedom Aims, Objectives," American Forces Press Service, March 21, 2003, U.S. Department of Defense, http://www.defense.gov/news/newsarticle.aspx?id=29253. (accessed October 5, 2014).
[5] Ibid.

simplistic analysis drove the subsequent military planning into a targeting mindset that focused on eliminating the regime's power by neutralizing Saddam. The reductionist model led to the following conclusions: With Saddam gone, the structure would collapse, opening the path to humanitarian aid, and fostering the introduction of democratic government.

Throughout the operation conventional military forces focused on the enemy force (the Republican Guard) and securing the oil fields. Although the initial invasion was flagged as an unequivocal success, in terms of military objectives achieved (securing oil fields, defeat of the Republican Guard), the broader objectives could not be achieved. Even with Saddam removed, the reductionist model could not predict an unstable Iraq, or the rise of Islamist opposition functioning as a quasi-state. The reliance on reductionist models underscored the lack of understanding of the environment and the systems within it, prior to introducing coalition military forces. If military senior leadership briefed President Bush and Secretary Rumsfeld that military operations centered on the removal of Iraqi security forces would lead to a decade long commitment, costing approximately 4,500 coalition casualties[6] and approximately 100,000 civilian casualties,[7] the response from the White House may have been quite different.

The PMESII model failed to generate a sufficient understanding of the dynamics and interactions of the major elements within the environment, let alone assist in forecasting the environmental reactions to military actions within the environment.

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[6] Iraq Coalition Casualty Count, "Iraq Coalition Military Fatalities by Year," icasulaties.org, http://icasualties.org (accessed October 5, 2014).

[7] David Sykes, "The 2003 Invasion of Iraq Under the Microscope," *E-International Relations Students*, June 10, 2010, http://www.e-ir.info/2010/06/10/the-2003-invasion-of-iraq-under-the-microscope/ (accessed October 5, 2014).

Instead, the PMESII model focused on the doctrinal examples – military and political structures. The PMESII reductionist analysis failed to make the distinction between the Saddam regime and Al-Qaeda.[8]

Focusing on the military structures within PMESII encouraged a reductionist analysis to provide target lists to mitigate risks for friendly forces. The deliberate bombing of Iraq's power distribution, for example, became a legitimate dual-use target to disrupt Iraq's military.[9] As a result, power output was reduced to 3,500 Mw for a demand of 6,000 Mw.[10] "Iraq's water purification & sewage treatment systems, health care, sanitation, and other related services faced major malfunctions."[11] It took eight years to re-build electrical generation capacity to the pre-invasion 2003 figures, with demand continuing to grow over that time.[12] The coalition took the blame for its inability to restore basic services.

This lack of appreciation of the environment led to the lack of understanding of the dynamics of Iraq state, the Sunni - Shia discord, and the effects of removing both the security organizations and the government structure. In short, there was limited understanding of the complexity of the environment.

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[8] Paul Pillar, "Intelligence, Policy, and the War in Iraq," *Foreign Affairs* (March/April 2006) http://www.foreignaffairs.com/articles/61503/paul-r-pillar/intelligence-policyand-the-war-in-iraq (accessed January 15, 2015).

[9] International Committee of the Red Cross, "United States/United Kingdom, Conduct of the 2003 War in Iraq," *How Does Law Protect in War?* January 27, 2012, https://www.icrc.org/casebook/doc/case-study/united-states-kingdom-iraq-2003-case-study.htm (accessed January 15, 2015).

[10] United Nations Assistance Mission for Iraq, "Overview of Iraq's Electricity," *United Nations Development Programme Iraq*, October 2008, http://iraqslogger.powweb.com/downloads/Overview_of_Iraq_Electricity.pdf?PHPSESSID=1d0997c112323e42a279e5b1a99a65f4 (accessed January 15, 2015).

[11] Souad Al-Azzawi, "Environmental Impacts of the Destruction of Iraq's Electricity Infrastructure," *The Brussels Tribunal*, October 27, 2013, http://www.brusselstribunal.org/article_view.asp?id=1209#.VOo5TMaDgai (accessed January 15, 2015).

[12] Ibid.

The removal of the security organizations that provided control over the population created a vacuum filled by other groups who took advantage of the opportunities to create disorder through violence. Not clearly identified prior, these groups surprised the military through the destabilized nature of the new environment, thereby requiring a new focus at understanding how to reduce this new threat. It also resulted in a growing anti-American sentiment as Iraqis increasingly perceived an imperialist agenda, rather than the liberation promised, as a result of the military invasion, occupation, and subsequent control of the key economic infrastructure. By failing to understand the environment and its complexity, and focusing only on how the environment influenced military forces, as well as making a simplistic assessment of the COG, the operational plan for OIF failed to meet the political strategic ends. This condemned the U.S. and coalition forces to a bloody stalemate.

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VITA

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